

# Activities at KTH Mechanics

*aiming to cooperate within the  
IFS Liasion Office*



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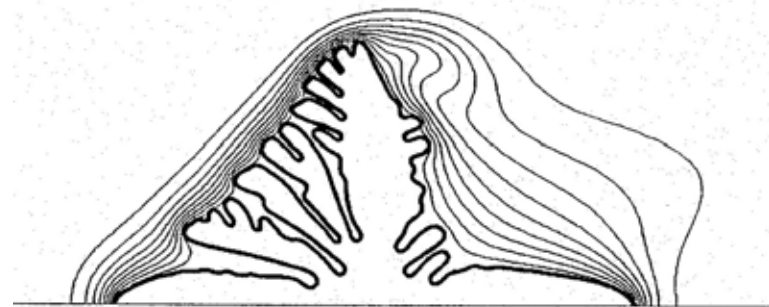
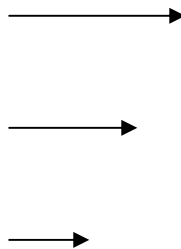
Fredrik Lundell, KTH Mechanics

# Research activities

- Experimental
- Computational fluid mechanics
- Direct numerical simulations/LES



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# Development of implants such as stents for restructuring blood vessel based on blood flow hemodynamics

- Project with Karolinska Institutet  
Visualization of blood flow in the brain aiming at a 3D reconstructions of the blood vessel
- Some CFD experience



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QuickTime™ and a  
Cinepak decompressor  
are needed to see this picture.

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# Application of Interfacial Flow Dynamics to Nanotechnology

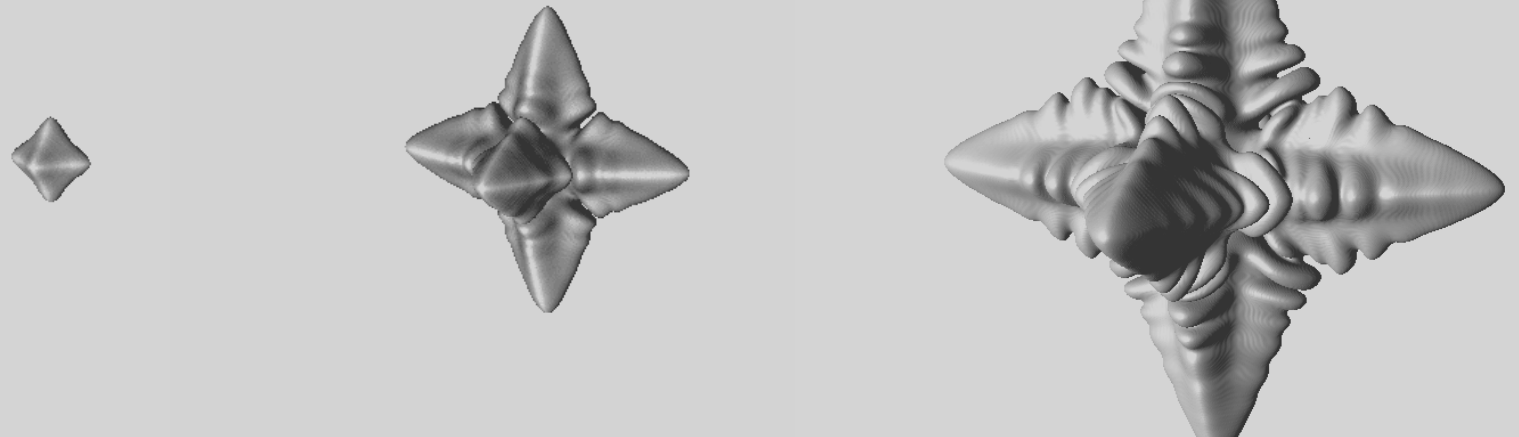
- Molecular Dynamics simulations of Solid-Liquid Interface (student at UT)
- Extensive experience in Phase Field Method
- mm-scale experiments on Marangoni convection



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# Flow Optimization of Vehicles in Relation to Greenhouse Problem



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- Transition and turbulence control
- Optimization of shape and control measures (suction, roughness etc) to minimize drag
- Wind tunnel experiments: transition delay w. roughness, reactive control...
- Cicero: Centre for Internal Combustion Engine Research Opus

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# International Collaborative Research on Flow Control in Advanced Transdisciplinary Field



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- Experimental, numerical and theoretical work
- Theoretical: model reduction, controller design etc
- Experimental: roughness to decrease disturbance amplitude, reactive control

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# International Collaborative Research on Active and Semiactive Control of Noise

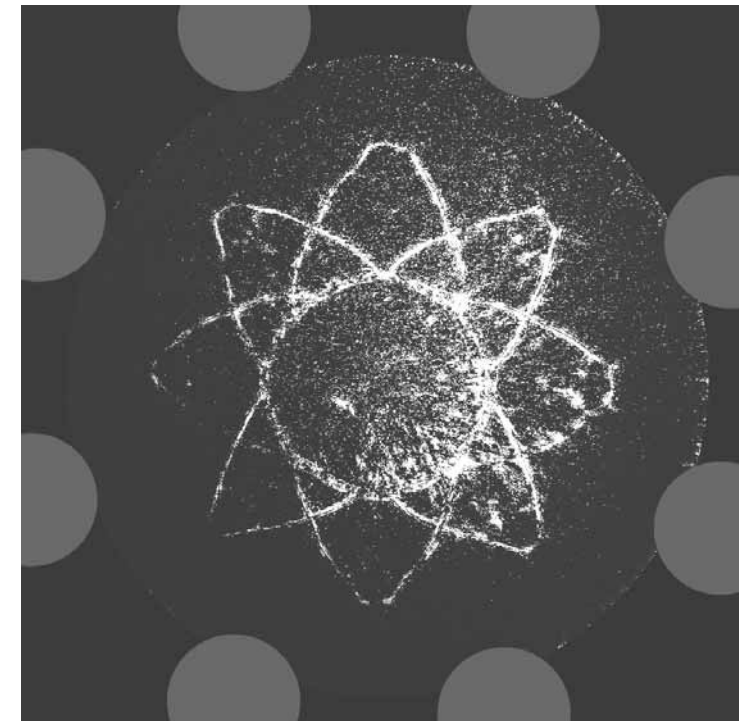
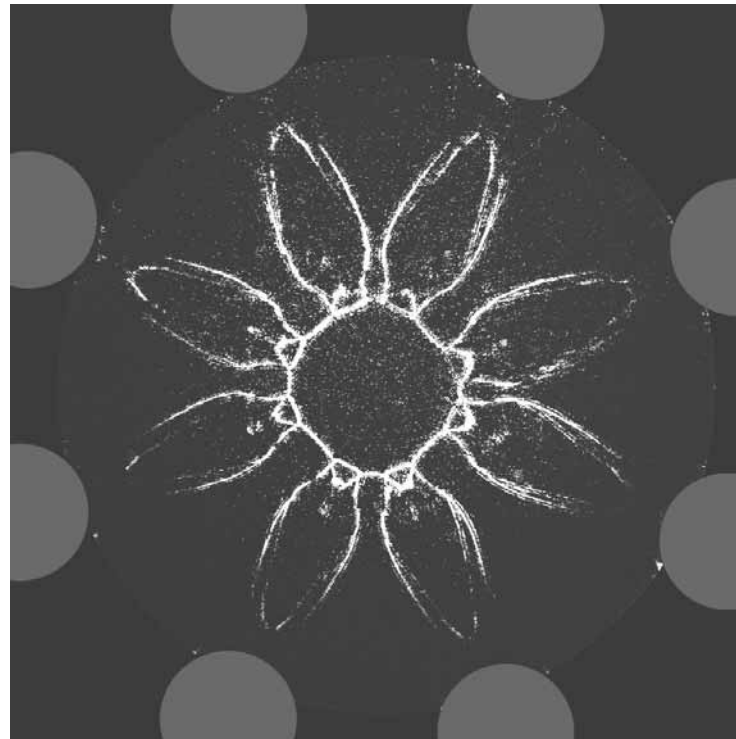
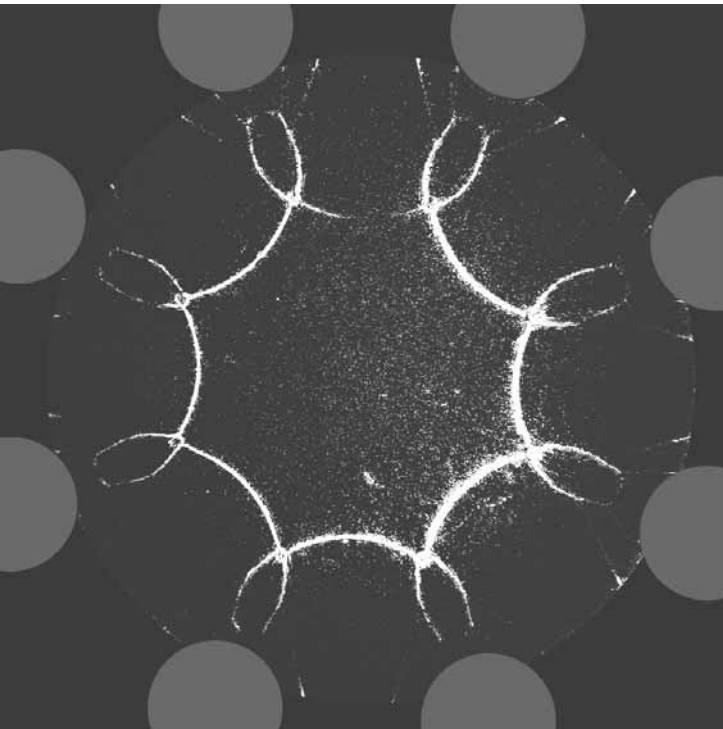
- MWL: large laboratory for sound and vibration research, facilities for studies of flow induced noise.



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# Investigation of Shock-Wave Phenomena in Complex Fluids Media and its Interdisciplinary Applications

- Studies on focusing shockwaves of various shapes



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# How can we do it?



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- KTH master students can do diploma thesis projects (5 months) at IFS as visiting researchers (*e.g. Lundell & Cederholm, 1997*)
- KTH PhD students can spend time at IFS as visiting researchers (projects has to be well correlated) (*Lundell 1999, Medici 2005*)
- IFS students can spend time at KTH (*Kawakami 1996, Shiomi 1998, Inasawa 1999 & 2000*)
- “Exchange” of Post-Docs (*Matsubara: KTH-IFS, Yoshioka: KTH-IFS*)